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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|---------------------|------------------|
| 10/774,940 | 02/09/2004 | James L. Hanna | 10588-032 | 8622 |
| 7590 | 10/31/2006 | | EXAMINER | |
| Robert K. Fergan BRINKS HOFER GILSON & LIONE P.O. Box 10395 Chicago, IL 60610 | | | PHAM, HOA Q | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2877 | |

DATE MAILED: 10/31/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|-------------------------|------------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 10/774,940 | HANNA, JAMES L. | |
| | Examiner Hoa Q. Pham | Art Unit 2877 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 08 August 2006.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1 and 4-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1,4-6,9,12-19,21,22 and 25-30 is/are rejected.
- 7) Claim(s) 7,8,10,11,20,23 and 24 is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 09 February 2004 is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

| | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____. |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____. | 6) <input type="checkbox"/> Other: _____. |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.
2. Claims 1, 9, 12-19, 21-22, 25-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakagawa et al (4,162,126) in view of makihira et al (4,410,278) (of record).

Regarding claims 1, 12 and 27; Nakagawa et al discloses a means (14a,14b, 14c) for conveying the part (13) having a surface for orienting the part; an illumination source (1, 1') configured to project a sheet of light (strips or rectangular cross-section, column 3, lines 19-20 and column 3, line 44) wherein the sheet of light intersects the part; an optical system (4) configured to focus reflected light from the sheet of light intersecting the part into an image (column 3, lines 27-29); a photosensitive array (110) (column 3, lines 35-38) positioned to receive the image and generate an output corresponding to the image; and a processor (17-19) configured to detect cracks in the part by analyzing the output of the photosensitive array, wherein the sheet of light intersecting the part forms a diffuse reflection and the image includes the diffuse reflection (column 3, lines 30-31). Nakagawa et al teaches that the image lens (4) is large enough to cover the longitudinal width of each of the objects (column 3, lines 27-28) and does not explicitly teach that the sheet of light intersects the part across the

part's width; however, such a feature is known in the art as taught by Makihira et al. Makihira et al, from the same field of endeavor, shows the sheet of light intersects the part across the part's width (figure 4) for the same purpose of detecting cracks of an object (1). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the light beam of Nakagawa et al as taught by Makihira et al to ensure that the entire surface of the object is detected.

Regarding claim 9, figure 2 of Makihira et al shows that the light sources (25 and photosensitive array (26) are mounted on a reference plate (16). It would have been obvious to one having ordinary skill in the art to mount the light source and detector of Nakagawa et al in a housing as taught by Makihira et al.

Regarding claims 13-14, figure 2 of Makihira et al shows that the parts are positioned on a V-track or V-groove (14, 15).

Regarding claims 15-16, see column 4, lines 56-62 of Nakagawa et al for the use of digital image (signal).

Regarding claims 17-18, 26 and 28, see column 5, line 65 through column 6, line 12 of Nakagawa et al for comparison between the picture elements with respect to the threshold level.

Regarding claims 19, 21 and 29, using a position sensor in an inspection system is well known in the art; thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to include in Nakagawa a position sensor for sensing the position of the workpiece, thus a accuracy of the inspection is obtained.

Regarding claim 22, Nakagawa et al and Makihira et al do not explicitly teach the use of a plurality of light sources and detectors forming source-array pairs arranged around the part to be inspected; however, it would have been obvious to one having ordinary skill in the art at the time the invention was made to replace the rotating means for rotating the test part by the use of a plurality of source-array pairs for the same purpose of inspecting the entire area of the part. Substitute one for another is generally recognized as being within the level of ordinary skill in the art.

Regarding claim 30, see track (14, 16) in figure 2 of Makihira et al.

Regarding claim 25, figure 2 of Makihira et al shows that the parts are positioned on a V-track or V-groove (14, 15).

Regarding claim 26, see column 5, line 65 through column 6, line 12 of Nakagawa et al for comparison between the picture elements with respect to the threshold level.

3. Claims 4-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakagawa et al and Makihira et al as applied to claim 1 above, and further in view of Kellie et al (4,532,723).

Regarding claims 4-5, Kellie et al, from the same field of endeavor, discloses an optical inspection system in which light source (3) is a multi-mode laser source (column 4, lines 46-47). For the same purpose of detecting cracks of an object, it would have been obvious to one having ordinary skill in the art at the time the invention was made

to replace the light source of Nakagawa et al by a laser source as taught by Kellie et al because they are function in the same manner.

Regarding claim 6, it also would have been obvious to replace the radiation system of Nakagawa et al by a laser source and a diffractive beam shaper so that the light projected on the surface of the part is a sheet of light because they are equivalent in function.

Allowable Subject Matter

4. Claims 7-8, 10-11, 20, and 23-24 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
5. Applicant's arguments with respect to claims 1 and 4-30 have been considered but are moot in view of the new ground(s) of rejection.
6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Takamoto et al (5,894,345) discloses an optical method of detecting defect.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hoa Q. Pham whose telephone number is (571) 272-

2426. The examiner can normally be reached on 7:30AM to 6 PM, Monday through Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley, Jr. can be reached on (571) 272-2800 ext. 77. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Hoa Q. Pham
Primary Examiner
Art Unit 2877

HP
October 25, 2006